Zoning (Z) WORKING GROUP (WG)
Williams Coast Guard Building

Boston, MA
9:30 am to 5:00 pm
31 May 2005

MEETING SUMMARY

ACTION: **Alternates to be used by WG membership**
For those WG members choosing to use alternates, the identification and contact information of the selected alternate must be provided to John Williamson, WG Chair and Ben Cowie-Haskell, Stellwagen Bank National Marine Sanctuary (SBNMS) Team Lead, by June 24, 2005.

ACTION: **New England Fishery Management Council (NEFMC) and National Oceanographic and Atmospheric Administration (NOAA) Northeast Fisheries Science Center (NEFSC) to be contacted concerning Z WG Technical Advisors**
Ben Cowie-Haskell will contact the NEFMC and NOAA NEFSC to have Technical Advisors assigned to the Z WG.

ACTION: **Provide Designation Document to WG**
Ben Cowie-Haskell will provide a copy of the Designation Document to the members of the WG.

ACTION: **Literature for Ecological Integrity Subcommittee**
Ben Cowie-Haskell will contact Les Kaufman to determine what background documentation should be provided to the Ecological Integrity Subcommittee.

AGREEMENT: **Alternates to be used by WG membership**
The WG agreed to use alternates. Alternates would be identified by individual WG members (see first Action Item above).

AGREEMENT: **Technical Advisors to be used by the WG**
The WG agreed to use Technical Advisors on an as needed basis. Technical Advisors will be used to provide expertise on issues that may develop during the course of WG discussions.

AGREEMENT: **Les Kaufman to serve as Ecological Integrity Subcommittee Chairman**
The WG agreed to assign Les Kaufman as Chair of the Ecological Integrity Subcommittee.

AGREEMENT: **Ecological Integrity Subcommittee**
The WG agreed that the membership of the Ecological Integrity Subcommittee should have no more than eight members. The membership should be comprised of technical experts and have representation of the interests present in the Z WG. In the event that outside expertise is needed, the subcommittee can call on outside technical advisors. The membership of the Ecological Integrity Subcommittee is as follows:

- Les Kaufman
- David Pierce
- David Bergeron

- Deb Cramer
- Lewis Incza
- Priscilla Brooks
- Charles Casella
- Mike Fogarty

Working Group Attendees (May 31, 2005):

Name	WG Seat / Affiliation	Attendance
John Williamson	SAC Chair / Fishing Community Activist	Present
Ben Cowie-Haskell	Team Lead (SBNMS)	Present
Deb Cramer	At Large / Science Writer	Present
Edward Barrett	Mobile Gear / MA Fishermen's Partnerships	Present
David Casoni	Fixed Gear	Present
Tom DePersia	Recreational Fishing/Charter / Stellwagen Bank Charterboat Assoc.	Present
Mary Beth Tooley	Pelagic Gear / East Coast Pelagics	Present
Charles Casella	Recreational Fishing	Present
Susan Farady	Conservation / The Ocean Conservancy	Present
Peter Borrelli	Conservation / Center for Coastal Studies	Present
Priscilla Brooks	Conservation / Conservation Law Foundation	Present
David Pierce	Government / MA Div. of Marine Fisheries	Present
Brian Hopper	Government / NOAA Fisheries, Protected Resources Div.	Present
Kate Killerlain Morrison	Government / MA Office of Coastal Zone Management	Present
Susan Murphy	Government / NOAA Fisheries, Sustainable Fisheries Div.	Present
Lewis Incza	Academic / University of Southern Maine	Present
Les Kaufman	Academic / Boston University	Not Present
Larry Madin	Academic / Woods Hole Oceanographic Institution	Present
Others Present		
Kent Thornton	Meeting Facilitator / FTN Associates	Present
David Bergeron	MA Fishermen's Partnerships	Present
John Swords		Present
Bridget Black	Student	Present
Timothy Feehan	PSGS	Present

WELCOME AND REVIEW OF AGENDA

John Williamson, WG Chair, welcomed the WG and opened the meeting. The Chair then reviewed the agenda for the meeting. The WG accepted the agenda with the addition of a discussion on the use of WG member alternates.

GROUND RULES AND CHARGE FOR THE DAY

Review of WG Role and Responsibility
The WG Chair presented the following summarized review of the role and responsibility of the WG, as found in the Reference Document:

- Any member of a WG may request a break or caucus to consult with other colleagues or constituents attending the meeting. The leadership of the group may also request or suggest a caucus.
- The focus of the WG will be working toward producing draft strategies and activities that eventually will comprise Issue-based Action Plans that address the respective issue or problem.

- The goal of the WG is to reach agreement on recommendations that will be forwarded to the Sanctuary Advisory Council (SAC). Thus, each WG member will be expected to:
    - make the best effort possible to reach agreement
    - share the responsibility of ensuring the success of the process and the quality of the outcome
    - keep the WG informed regarding constraints on your decision-making authority on behalf of your agency or constituency
    - keep your agency or constituency informed about the perspectives, concerns and interests of the WG
    - actively participate in discussions
    - avoid characterizing the motives of others
    - refrain from distracting others through side conversations
- Each member has an obligation to articulate interests and build agreements by negotiating a recommendation for adoption by the SAC. In exchange, each member has the right to expect:
    - a full articulation of agreement and areas of disagreement, if any
    - an opportunity to revisit issues on grounds of substantial new information that becomes available during the WG's deliberations
- In the event that one or more members disagree on a specific aspect of an issue, the recommendation will be forwarded to the SAC indicating points of agreement and points of disagreement. In the case of an incomplete recommendation from a WG (anything less than full agreement), the sanctuary will develop that portion of the recommended Action Plan. It is understood that members should voice their concerns with specific elements of the developing Action Plan along the way, rather than waiting until a final recommendation has been developed.
- When unable to support a unanimous agreement, a member has an obligation to demonstrate that the item at issue is a matter of such principle or importance that his or her constituent's interest would be substantially and adversely affected by the proposed decision. In addition, it is the responsibility of the dissenting party to: 1) state the reason(s) underlying their withholding of agreement in sufficient detail, and 2) offer an alternative suggestion that satisfactorily addresses not only their concerns and interests, but also those of other members of the WG as well.
- The recommendations to be forwarded by the WG are not intended to be determined by a majority vote. A clear, definitive record of the WG discussion will be essential when the SAC reviews WG recommendations. Communication of what the pro's and con's of a recommendation will be invaluable as the sanctuary develops the draft Management Plan.

It was decided that in addition to the points listed above, any issue that was identified as not meeting the WG's obligation to the public should be brought to the attention of the WG by any member. In addition, for the sake of the meeting process, all table discussion during the meeting would be reserved for WG members only.

INTRODUCTIONS

Kent Thornton, FTN Associates and Meeting Facilitator, requested that each person present introduce themselves and provide some background information. This exercise was intended to help all WG members become more familiar with each other, provide information that would identify each member's point of view, and identify areas of commonality among members. Each person was asked to provide the following:

- Name

- Affiliation
- Background Information
- Something other members did not know about the person
- Expectations for the Z WG

Z WG ALTERNATES

The Chair called for a discussion on the use of alternates during meetings of the Z WG. According to the WG Reference Document:

> *"A working group may or may not decide to appoint alternates for members. However, consideration as to whether alternates are appropriate must take into account the short duration of the working group. If alternates are chosen, it will be very important that members actively inform their alternates on the progress of the working group to assure that an alternate does not slow down the process due to lack of understanding. It will also be important for members to encourage their alternates to participate in all the working group meetings so they will be current with discussions*
>
> *All working group members have the responsibility to attend working group meetings. If the group agrees to host alternates, members must inform the chair if they will miss a meeting and the alternate will be sitting in the members stead."*

Issue 1: **The Use of Alternates**

Based on the statement above from the Reference Document, the WG discussed using alternates.

> ***Discussion:*** It was explained by the Chair that if alternates were to be chosen, the alternates would need to be equal in expertise as the sitting representative. It was also stressed that members and alternates must communicate to inform the alternates of WG progress. If the WG decided not to use alternates, it is important that all members be present for subsequent meetings.
>
> For clarification, some members questioned if alternates would have the authority to vote. It was explained that alternates do not have the authority to vote. In past WGs, alternates have helped to make agreements, but could not vote. If alternates were not used, missing members would need to have access to WG discussion and have the opportunity to provide their opinion.
>
> There was some question as to what could happen if a member both failed to attend meetings and failed to send an alternate, yet attempted to write an individual option. It was explained that all attempts would be made to correct such a situation before getting to that point. However, there would be value in the individuals opinion, but it would not carry the same weight as the WG as a whole. The WG could decide what to do, either keep the opinion or discard it due to the failure of the member to attend meetings.
>
> Some members expressed that since some seats were duplicated, such as the Academic seat, it could be possible to have an already sitting member act as an alternate. In the case of the Academic seats, teaching and research schedules may make WG attendance problematic. These members stated that finding alternates would be difficult, and that the three seats could alternate for each other. It was explained that although it would be preferential for all members to be present, such an arrangement could be possible pending WG approval.

It was decided by the WG to use alternates. Members would use alternates on an as needed basis. It is up to the discretion of individual members to use alternates. For those WG members choosing to use alternates, the identification and contact information of the selected alternate must be provided to the WG Chair, and Ben Cowie-Haskell by June 24, 2005.

Issue 2: **Technical Advisors**
For the provision of expertise on an as needed basis, it was proposed that Technical Advisors be assigned to the WG.

Discussion: It was explained that it was standard for other WGs to use Technical Advisors to provide presentations. When other WGs needed specific information, the use of Technical Advisors was found to be useful. Currently, staff from the NEFMC and NOAA NEFSC are being asked to serve as Technical Advisors. Other Technical Advisors could include a social scientist and/or economist. It was agreed by members of the WG that the use of Technical Advisors would be an evolving process. As issues developed, specific expertise could be called in on an as needed basis. As such, specific Technical Advisors would not need to be identified at the present time.

During the normal operation of the WG, present members would have the opportunity to provide personal expertise should the need arise. The Chair will provide direction and ask for clarification as to whether an opinion is from the perspective of the seat or provided as personal expertise.

PRESENTATIONS

Background on Ecosystem Based Management (EBM) and the Z WG Mission
The Chair and Ben Cowie-Haskell provided background information on the development of the Z WG during the EBM WG.

EBM Action Plan (AP)
Due to scoping comments concerning zoning, the EBM WG was tasked with reviewing the zoning issue; the EBM WG recommended creating a Zoning Working Group to fully examine the concept. The EBM WG also determined that an operational definition of 'ecological integrity' needed to be developed by the Sanctuary program. It is for this reason the Z WG has been asked to convene a subcommittee to advise on that definition because of its pertinence to the zoning question. It is also important to note that the six strategies developed by the EBM WG were agreed upon with consensus.

The activities from the EBM AP (Appendix A) that deal directly with defining ecological integrity and forming a Z WG are as follows:

"**(4.1)** *Develop an operational definition of ecological integrity.*
Ecological integrity is a term that is location and scale dependent. It is both an intuitive and a technical term. While ecological integrity has not yet been defined for the SBNMS various definitions point to the notion of maintaining the wholeness of an ecosystem, or portion thereof, such that the system's native diversity and functioning are likely to persist. The objective of this activity is to develop an operational definition of ecological integrity that can be evaluated and monitored over time."

"**(5.1)** *Establish a zoning WG to evaluate the adequacy of existing zoning schemes in SBNMS to satisfy the scientific requirements and meet the goals of EBSM and if needed, develop a modified zoning scheme (including a consideration of fully protected reserves) to meet those goals and requirements.*
The zoning WG shall be established by the SAC at its November 2004 meeting for the purpose of reviewing and evaluating data and information as it becomes available through various venues (e.g., Omnibus Essential Fish Habitat process, sanctuary efforts) and making a recommendation to the SAC and ultimately to the sanctuary superintendent. The membership of the zoning WG shall be of representative stakeholder groups similar to the EBM WG. The zoning WG shall begin meeting in January 2005 in order to efficiently utilize the time that the final management plan is in preparation.

The zoning WG shall develop metrics for zone performance based on the objectives of the various zones as determined by the WG. These metrics shall form the foundation of a monitoring program designed to determine the efficacy of the zoning scheme and recommend any needed changes to accomplish the goals of the zoning scheme and EBSM.

The zoning WG shall make recommendations to the SBNMS regarding the zoning scheme within two years of the implementation of the final management plan as defined by the publication date for the Federal Register Notice notifying the public of the availability of the final management plan."

The SAC has incorporated the development of a definition for ecological integrity into the charge of the Z WG. In the Mission Statement of the Z WG, the SAC has defined the process that the WG should follow. This process is as follows:

"Process
1. Z WG convenes and assigns a subgroup to come up with 2-3 operational definitions of ecological integrity with measurable parameters.
2. Subgroup makes recommendation on definition of ecological integrity appropriate for the SBNMS.
3. Z WG evaluates existing zoning scheme based on agreed upon criteria associated with the scientific requirements and goals of EBSM.
4. Z WG makes recommendation to SAC on adequacy of existing zoning scheme.
5. SAC makes recommendation to superintendent on adequacy of existing zoning scheme and future of the Z WG.
6. If necessary, the ZWG continues deliberations to develop a modified zoning scheme (including a consideration of fully protected reserves) for the purpose of meeting the scientific requirements and goals of EBSM within 2 years of final management plan implementation."

Questions & Answers
Question 1: Does the mention of "*Status:* Completed by year 2" in the Activity 5.1 in the EBM AP mean the second year after the Management Plan was issued?

Answer: The target of the EBM WG was to get the process started quickly. It was determined that the Z WG process should be completed between November 2005, through January 2006. The EBM WG tentatively set the timing for the Z WG for then.

Question 2: In the EBM AP, Strategy EBM.1 suggests that a steering committee be established within year 1 to create a definition of 'ecological integrity' but we are forming a subcommittee of the Z WG to handle this. Does the EBM AP need to be amended?

Answer: The definition developed by the ZWG will meet the requirements of strategy EBM.1.

Question 3: What is the progress of the draft Management Plan for the SBNMS?

Answer: The draft Management Plan is set to be released in the fall of 2005.

Z WG Purpose, Outcomes and Process

The Chair provided information concerning the purpose, outcomes and process for the Z WG.

Purpose

The purpose of the Z WG comes directly from the National Marine Sanctuaries Act (NMSA). The following selected purposes from the NMSA are relevant to the purpose of the Z WG :

> "*(1) to identify and designate as national marine sanctuaries areas of the marine environment which are of special national significance and to manage these areas as the National Marine Sanctuary System;*
> *(2) to provide authority for comprehensive and coordinated conservation and management of these marine areas, and activities affecting them, in a manner which complements existing regulatory authorities;*
> *(3) to maintain the natural biological communities in the national marine sanctuaries, and to protect, and, where appropriate, restore and enhance natural habitats, populations, and ecological processes;…*
>
> *(6) to facilitate to the extent compatible with the primary objective of resource protection, all public and private uses of the resources of these marine areas not prohibited pursuant to other authorities;…*
>
> *(8) to create models of, and incentives for, ways to conserve and manage these areas, including the application of innovative management techniques; and…*"

Other information can also be found in the SBNMS Designation Document. The Designation Document has not been provided to the Z WG, but will be made available to members.

Outcomes

During the EBM WG, there was always a question of jurisdiction. The SBNMS will be working in conjunction with NOAA Fisheries and the NEFMC. This relationship is integral to the SBNMS. Concerning the Z WG, it is not the purpose of the sanctuary to manage fisheries. However, it is important to note that the sanctuary will be integrating with organizations that have the authority to manage fisheries.

Process

The process for how the WG shall operate is described in the Ground Rules listed at the beginning of this document. The WG will be making decisions with the entire set of expertise at the table, and plenty of time will be provided for discussion. It is important that all members provide information and feedback to the entire WG concerning their point of view, and identify areas where agreement can or cannot be made. The WG will work to have consensus; however, the Reference Document explicitly states:

"If agreement cannot be reached on a recommendation to the SAC, the working group will forward to the SAC an objective summary of their areas of agreement and the areas of disagreement. In no case will there be a statement of what portion of members were in favor of or opposed to any provision on which there is continuing disagreement. Again, recommendations are [not] intended to be supported by majority vote or popularity."

Z WG ECOLOGICAL INTEGRITY SUBCOMMITTEE

Kent Thornton, WG Facilitator, lead the Z WG discussion on the Ecological Integrity Subcommittee. During this discussion, Z WG members were asked to debate the purpose of the subcommittee and the criteria of subcommittee membership. Members were then asked to select appropriate members for the Ecological Integrity Subcommittee.

Ecological Integrity Subcommittee

Members of the Z WG were given suggested parameters on what the subcommittee should look like and what it should accomplish. As to the definition of 'ecological integrity', it was stated that the definition should be applicable to the SBNMS and be measurable. The subcommittee would have the entire summer to create this definition and provide it to the Z WG. The subcommittee itself should be small in number and be comprised of technically minded and scientifically trained members. There are potentially many definitions of 'ecological integrity' and not much consensus between these definitions. This subcommittee needs to create a definition that works for the SBNMS and can be applied consistently. While having its discussion, the Z WG should be prepared to make decisions on:

- How much time the subcommittee should take?
- How many members should the subcommittee have?
- Who will the members be?
- What Terms of Reference should be used?

Issue 1: **Subcommittee Purpose**

The Ecological Integrity Subcommittee will follow the task as laid out in the EBM AP. This subcommittee will also be understanding that a definition for 'ecological integrity' should be applicable to Strategies EBM.1 and EBM.2 in the EBM AP. The fist step is to develop an operational definition for 'ecological integrity'. This definition must be broad and comprehensive but it must also have an operational component meaning that it must be measurable in the context of SBNMS. The subcommittee should strive for a consensus definition, but if no consensus can be reached there should be no more than three optional definitions for 'ecological integrity'. The definition must serve as a filter against which existing zones will be examined and determine if zones preserve the ecological integrity of SBNMS. The definition shall be delivered by mid to end September 2005 so that the Z WG can convene in October.

> ***Discussion:*** Some members suggested that the process needed more direction, such as should the definition be applied to a wilderness state or multiple use state. Other members stated that using a wilderness state would be against what the EBM WG accepted. The SBNMS is an area that has multiple uses, and these members explained that a definition should reference this. It was expressed by some members that 'ecological integrity' in the context of a National Marine Sanctuary is not a solely scientific effort. These members stated that the SBNMS is a multiple use area and a definition will be complex, as it will be dealing with social and political values.

Members who were involved with the EBM WG stated that the group struggled with the complex issues dealing with a definition, and established the means of creating a usable definition of 'ecological integrity' that could be monitored over time. These members cautioned that it is not the charge of the Z WG to discuss the concepts of ecological integrity. The Z WG is charged to form the subcommittee that will deal with these issues. It was suggested that there are experts dealing with the concepts of ecological integrity should be involved in this process, such as John Boreman, Steve Murawski, and Mike Fogarty.

It was suggested by some members that the definition of 'ecological integrity' must serve as a functional management tool. As such, it must be tied to a research plan that can further develop, review and refine the definition. Currently, not much is known and research must be conducted. The definition must also consider the operational realities within the SBNMS. These members cautioned that there is a danger in leaving items out. The definition must be broad and identify what can and cannot be done in reality. The definition must be comprehensive as there will always be the question of what the definition was based on.

Issue 2: **Criteria for Membership on Subcommittee**

The WG discussed the criteria for membership on the Ecological Integrity Subcommittee. Due to the diverse nature of the SBNMS, members suggested a wide range of expertise to serve on the subcommittee. The following is a listing of the suggested expertise:

- Theoretical Ecologist
- Natural Scientist
- Social Scientist
- Economist
- Physical Oceanographer
- Chemical Oceanographer
- Benthic Ecologist
- Fisheries Biologist with modeling (ecological and food web models, biological and physical interactions models) background

Issue 3: **Membership Selection**

The Z WG determined that the Ecological Integrity Subcommittee should be comprised of no more than eight members. The membership should be comprised of technical experts and have representation of the interests present in the Z WG. In the event that outside expertise is needed, the subcommittee can call on outside technical advisors. The technical advisors shall have, but are not limited to, the expertise listed above. The membership of the Ecological Integrity Subcommittee is as follows:

- Les Kaufman
- David Pierce
- David Bergeron
- Deb Cramer
- Lewis Incza
- Priscilla Brooks
- Charles Casella
- Mike Fogarty

Discussion: Some members stressed the need to keep subcommittee small. They cautioned against making the subcommittee large and re-creating the Z WG. These members stressed that a small, technical and scientific subcommittee is needed to create the definition of 'ecological integrity'. However, other members stated that there are many interested parties that use SBNMS that are not scientists. It would be useful to have these stakeholders there to help provide a working definition of 'ecological integrity'. Some of these members worried that a pure science definition would be unacceptable to certain stakeholders. Some other members stated thayt they would be reluctant to make a definition without commercial input. It was suggested that stakeholders should be incorporated into the process as technical consultants.

It was agreed that the subcommittee could start with a purely scientific construct, then filter the definition down to include the sensitivities of the Z WG. The technical consultants can be used to make sure the definition is applicable to the real world situation. Their involvement will ensure that the definition has agreement, which will make the work of the Z WG much easier.

FINAL COMMENTS

Meeting adjourned.

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Sanctuary System
Stellwagen Bank National Marine Sanctuary
175 Edward Foster Rd.
Scituate, MA 02055
(781) 545-8026 FAX: (781) 545-8036

ZONING WORKING GROUP MEETING
Coast Guard Building
408 Atlantic Avenue
Boston, MA
31 May 2005
9:30 A.M. – 5:00 P.M.

Tuesday, 31 May 2005

9:30 **Welcome and Review of Agenda** (John Williamson)

9: 40 **Ground Rules and Charge for the Day** (Kent Thornton, FTN Associates)

9:50 **Introductions, Work Group Members Background and Affiliation, and Member Expectations (**All**)**

11:30 **Background on Ecosystem Based Management and Origin of Zoning Working Group (**Williamson**)**

11:50 **Morning Summary and Afternoon Activities (**Thornton**)**

12:00 ***Networking Lunch***

1:30 **Zoning Working Group Mission (**Ben Cowie-Haskell**)**

1:40 **Zoning Working Group Purpose, Outcomes, and Process (**Williamson**)**

1:50 **Ecological Integrity Subcommittee (**All**)**

- **Subcommittee Purpose: Develop Alternative Definitions for Ecological Integrity for Zoning Working Group Review**
- **Criteria for Membership On Subcommittee**
- **Membership Selection**

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3:00 ***Break***

3:15 **Ecological Integrity Subcommittee (**Continued**)**

4:00 **Schedule, Next Steps**

4:30 **Summary of Afternoon Session** (Thornton)

4:45 **Final Comments, Thoughts —** (Williamson, Cowie-Haskell)

5:00 ***Adjourn***

APPENDIX A

Gerry E. Studds Stellwagen Bank National Marine Sanctuary
Ecosystem-Based Management Action Plan

Overview

The U.S. Commission on Ocean Policy offers the following definition of ecosystem-based management (EBM):

> "Ecosystem-based management looks at all the links among living and non-living resources, rather than considering single issues in isolation. This system of management considers human activities, their benefits, and their potential impacts within the context of the broader biological and physical environment. Instead of developing a management plan for one issue (such as a commercial fishery or an individual source of pollution), ecosystem-based management focuses on the multiple activities occurring within specific areas that are defined by ecosystem, rather than political, boundaries."

The approach put forth by the Commission is entirely consistent with the policies and purposes of the National Marine Sanctuaries Act (NMSA). The NMSA provides authority to the National Marine Sanctuaries "for comprehensive and coordinated conservation and management of these marine areas, and activities affecting them, in a manner which complements existing regulatory authorities…" The NMSA directs the sanctuary to "maintain the natural biological communities in the national marine sanctuaries, and to protect, and, where appropriate, restore and enhance natural habitats, populations, and ecological processes;…", as well as, "create models of, and incentives for, ways to conserve and manage these areas, including the application of innovative management techniques;…", while at the same time "facilitating uses to the extent compatible with the primary purpose of resource protection…"

This Action Plan strives to adopt this approach by detailing a series of actions that will lay the foundation for effective ecosystem-based management.

Description of the Issues

The public comment scoping process conducted by the Stellwagen Bank National Marine Sanctuary (SBNMS) in 1998, and again in 2002, identified several concerns relative to the need for comprehensive ecosystem protection and conservation of biological diversity at the SBNMS. Issues raised during public scoping were summarized as follows:

- Need for comprehensive ecosystem protection
- Zoning in the SBNMS including no-take zones
- EBM practices
- Boundary Modification

This Action Plan addresses these public issues comprehensively.

Issue Statement

EBM arose in the late 20th century to address the pervasive scientific uncertainty inherent in natural systems and the failures of single species management approaches to adequately address that uncertainty. The concept of an ecosystem, on which any discussion of EBM depends, can be defined as a biological community together with its associated physical environment. In the context of the marine environment, this would include all marine organisms including humans as well as the physical properties of the water column and the seafloor.

As the sanctuary is not an ecosystem unto itself but rather part of the much larger Gulf of Maine (GOM) ecosystem, the application of EBM to the SBNMS can be approached along two parallel tracks. First, the application of EBM at the SBNMS will involve the intensive collaboration with other regional agencies charged with managing components of the ecosystem beyond the sanctuary boundaries. Second, for management within the sanctuary boundaries, the guiding principles of EBM can be used in an EBM approach where an obvious sub-set of the larger GOM ecosystem is being managed.

There are no comprehensive EBM plans in the southern GOM at this time. The SBNMS currently regulates the mining of sand and gravel, disturbance of the seafloor (with the exception of fishing activity), and dumping of waste material within its boundaries. Fisheries management in the Federal waters of the region is conducted on a species by species basis. Similarly, even though the National Oceanic Atmospheric Administration (NOAA) Fisheries Atlantic Large Whale Take Reduction Team has grouped a number of large cetaceans under its auspices, the Marine Mammal Protection Act is enforced on a species by species basis.

Working Group

In order to address these issues the Sanctuary Advisory Council (SAC) convened an EBM Working Group (WG) composed of 19 members representing a cross-section of stakeholders. The EBMWG met seven times over a 9 month period and developed three alternative scenarios (A-C) representing a range of protection for the group's consideration. The EBM WG decided to focus on crafting a compromise action plan (around scenario B) which ultimately the group came to consensus on. This Action Plan is the consensus document. Scenarios A and C are included as appendices to this document for reference.

Goal Statement

The EBM WG considered the many definitions of EBM within the context of the sanctuary's situation and came to consensus on the following definition and goal:

> *Ecosystem-Based Sanctuary Management (EBSM) integrates knowledge of ecological interrelationships to manage impacts within sanctuary boundaries. The general goal of EBSM is to protect the ecological integrity of the SBNMS while recognizing that the sanctuary is nested within GOM large marine ecosystem. Effective implementation of EBSM should: (1) consider ecological processes that operate both inside and outside sanctuary boundaries, (2) recognize the importance of species and habitat diversity, and (3) accommodate human uses and associated benefits within the context of conservation requirements.*

Objectives

The objectives of this plan are to:

- Comply with the purposes and policies of the NMSA
- Understand ecosystem structure and function
- Recognize the interconnectedness with the larger ecosystem
- Recognize our uncertainty of how ecological systems function
- Manage adaptively
- Maintain public accessibility to SBNMS
- Achieve environmental sustainability of sanctuary resources
- Maintain and enhance biological diversity and ecological integrity
- Reduce habitat impacts by users
- Establish a process for creating a zoning scheme

Addressing the Issues – Strategies for this Action Plan

The EBM WG developed the following research and management strategies to begin implementing EBM and establishing the infrastructure and framework for its continued development. Measures to evaluate the performance of strategies and their associated activities are listed at the end of each strategy/activity group.

There are six Strategies in the EBM Action Plan:

- EBM.1 – Establish a Research Steering Committee
- EBM.2 – Establish a Collaborative Research Consortium
- EBM.3 – Establish an Information Management Program
- EBM.4 – Understand Ecosystem Structure and Function
- EBM.5 – Protect Ecological Integrity
- EBM.6 – Evaluate the Need and Feasibility for Modifying the Sanctuary Boundary

Each strategy is detailed below.

STRATEGY EBM.1 – ESTABLISH A RESEARCH STEERING COMMITTEE

Strategy Summary

The committee should be a WG of the SAC that will assist in developing a research and monitoring plan for the SBNMS, recommending parameters for monitoring that are easily measurable and can serve as biological reference points, and developing an operational and quantifiable definition of ecological integrity.

Strategy Performance Measure: Research steering committee is established by SAC within 1 year.

Activities (1)

(1.1) *Establish a steering committee.*

The SAC must establish the steering committee as a WG so that outside members can participate.

Status: Completed by year 1.

Potential Members: SBNMS staff, New England Fishery Management Council (NEFMC) staff, NOAA Fisheries Northeast Fisheries Science Center (NEFSC) staff, academia, fishing industry, conservation organizations.

STRATEGY EBM.2 – ESTABLISH A COLLABORATIVE RESEARCH CONSORTIUM

Strategy Summary

The consortium shall be composed of academic, government, fishermen, and private interests who seek to understand how the sanctuary functions. The consortium is a more informal body than the steering committee and its purpose is to further the knowledge of the sanctuary system by fostering collaborative research between users and researchers on topics such as marine mammal acoustics, prey dynamics, oceanography, water quality changes, fish movement, etc.

Activities (2)

(2.1) *Convene sanctuary science symposium.*
The science coordinator shall organize a symposium on sanctuary science for the purpose of laying the foundation for a consortium and identifying the high priority issues that need to be investigated. This may become a biannual symposium the objective of which is to share knowledge with the SAC, SBNMS staff and other interested parties.

Status: Completed by year 1.

Potential Partners: Researchers, managers, academia, public.

(2.2) *Initiate consortium.*
The science coordinator shall initiate the consortium through email/listserve and a website specifically designed to foster the sharing of ideas and posting of results.

Status: Completed by year 2.

Potential Partners: Researchers, managers, academia, public.

STRATEGY EBM.3 – ESTABLISH AN INFORMATION MANAGEMENT PROGRAM

Strategy Summary

Using SBNMS' existing infrastructure capacity with outside software expertise, the sanctuary will develop a system with which to integrate, process, synthesize, and analyze scientific data. To maximize the utility of such a system, the user should be able to connect across the system for individual querying of all available data sets. The system will be made available for practical application on both an intuitive and expert level.

The objective of this system is to develop a well-designed information management and dissemination tool to facilitate science-based management. The system is designed to be widely applicable and accessible to SBNMS staff, scientists, decision makers, and the public. By setting up a database on an in-house server, SBNMS can expand the range and uses of existing data. Additionally, any user will be able

to bring in a database, upload it into the sanctuary's system, and carry out any type of data analysis or processing from statistical analysis to support for management decisions.

Strategy Performance Measure: Information management system with public access shall be operational within 3 years.

Activities (7)

(3.1) *Establish quality assurance/quality control program.*
This program will ensure the integrity and quality of the data from the moment it is collected to the point at which it is archived.

Status: Completed by year 1.

Potential Partners: Internal.

(3.2) *Establish proprietary use policy.*
This policy will accord researchers sole rights to the data for a set time period after data collection to give them the first opportunity to publish. The policy should be modeled after the one used for the Global Ocean Ecosystems Dynamics (GLOBEC) program.

Status: Completed by year 1.

Potential Partners: Researchers.

(3.3) *Establish a full-time data manager.*
A full-time data manager is needed to administer this program.

Status: Completed by year 1.

Potential Partners: Internal.
(3.4) *Design an information management system.*
An information management system shall be designed that meets specified requirements related to data input, data access by various users, metadata, analysis, etc.

Status: Completed by year 1.

Potential Partners: Contractors, researchers, educators.

(3.5) *Implement an information management system.*
The information management system will be implemented first for internal use by SBNMS staff and then for access by the public.

Status: Completed by year 1.

Potential Partners: Contractors.

(3.6) *Process existing data.*

Databases maintained by the SBNMS or that SBNMS has access to will be processed and made available for analysis.

Status: Completed by year 2.

Potential Partners: Research steering committee.

(3.7) *Design and implement a web portal for public access to databases.*
The sanctuary has an obligation to make the data it collects or pays for accessible to the public within a reasonable timeframe. A web portal shall be designed that enables this access while maintaining the security of the NOAA network.

Status: Completed by year 3.

Potential Partners: Researchers, managers, academia, educators, public.

STRATEGY EBM.4 – UNDERSTAND ECOSYSTEM STRUCTURE AND FUNCTION

Strategy Summary

Ecosystem structure refers to how the components of an ecosystem are arranged, both horizontally and vertically. Ecosystem function refers to the processes that structure the ecosystem such as predation, succession, reproduction, and competition. The purpose of this strategy is to understand what components make up the sanctuary ecosystem and what processes influence the arrangement of the components.

Strategy Performance Measures:

1. Draft operational definition of ecological integrity by year 1.
2. Appropriate measures of biodiversity selected by year 1.
3. Trend analysis of suite of indicator species shall be analyzed by year 3 and completed thereafter on an annual basis.
4. Nutrient loadings in the sanctuary from local and far-field sources shall be quantified by year 5.
5. The dispersal rate and trajectories of model larvae under various environmental conditions shall be quantified by year 3.
6. The movement rates and distances of cod and redfish over gravel and boulder habitats during all seasons shall be quantified by year 4.
7. Real-time oceanographic and meteorological data shall be provided via the web for at least two locations within the SBNMS by year 5.
8. Benthic habitats in the entire sanctuary shall be mapped at a scale of 1:60,000 or better by year 5.

Activities (14)

(4.1) *Develop an operational definition of ecological integrity.*
Ecological integrity is a term that is location and scale dependent. It is both an intuitive and a technical term. While ecological integrity has not yet been defined for the SBNMS various definitions point to the notion of maintaining the wholeness of an ecosystem, or portion thereof, such that the system's native diversity and functioning are likely to persist. The objective of this activity is to develop an operational definition of ecological integrity that can be evaluated and monitored over time.

Status: Draft operational definition and metrics for measuring ecological integrity by year 1.

Potential Partners: Proposed research steering committee, proposed consortium, fishermen, other users.

(4.2) *Develop appropriate measures of diversity and those processes that mediate patterns of diversity.*
There are various ways to measure biological diversity and the processes that contribute to it. This activity is aimed at evaluating various measures and determining which ones most appropriately reveal the effectiveness of management actions.

Status: Completed by year 1.

Potential Partners: Proposed research steering committee, proposed consortium, academia.

(4.3) *Establish a biological and physical monitoring program.*
This program shall discern changes in the natural systems of the sanctuary. This program shall develop a comprehensive understanding of changes in ecosystem status. One objective of this monitoring program shall be to determine the efficacy of any zones that are implemented in the sanctuary.

Status: Initiated by year 2.

Potential Partners: Proposed research steering committee, proposed consortium, Massachusetts Fishermen's Partnership (MFP) Fishermen's Initiative for Scientific Habitat and Ecosystem Research (FISHER), other users.

(4.4) *Establish an improved human use monitoring program.*
This requirement is necessary in order to fully understand the level of usage in the sanctuary, the socioeconomic impacts of regulations, the spatial and temporal distribution of usage, and the usage adjacent to currently closed areas. The program should provide adequate spatial resolution to confidently reconstruct the spatial distribution of human impacts with statistical confidence relative to habitat. Such activities could include automated information systems (AIS), vessel monitoring systems (VMS), radar, and refinement of vessel trip reports (VTR) and call in system. These activities will be implemented in consultation with the NEFMC, NOAA Fisheries, U.S. Coast Guard (USCG), citizens and other concerned parties.

Status: Initiated by year 1.

Potential Partners: NEFMC, NOAA Fisheries, USCG, citizens, other concerned parties.

(4.5) *Establish a directed research program.*
This program shall complement the monitoring program by investigating ecological processes that explain the patterns identified from monitoring. The research steering committee should advise on the questions to be answered.

Status: Initiated by year 2.

Potential Partners: Research steering committee, consortium, fishermen, other users.

(4.6) *Establish collaborative research programs with the recreational and commercial fishing industries to help answer specific questions about the ecology of the sanctuary and its use.* Examples would include the Northeast Consortium (NEC) and the MFP FISHER within the SBNMS.

Status: Initiated by year 2.

Potential Partners: MFP, NEC, regional nongovernmental organizations (NGO's), NEFMC, NOAA Cooperative Research Partners Initiative (CRPI), universities.

(4.7) *Develop a dynamic ecosystem model linking patterns of diversity with ecological processes.*
An initial product of this effort will be a static conceptual model showing functional relationships between species. The research steering committee will then review the model and make recommendations to SBNMS.

Status: Initiated by year 2.

Potential Partners: Proposed research steering committee, academia, contractors.

(4.8) *Classify and map benthic habitats.*
The SBNMS currently has high resolution multibeam imagery of the entire SBNMS. However, benthic habitats have not been classified or mapped based on the multibeam data and groundtruthing data (e.g., video, sediment sampling and other means). These data would greatly facilitate planning and resource management efforts.

Status: Completed by year 4.

Potential Partners: U.S. Geological Survey (USGS), proposed consortium, academia, MFP.

(4.9) *Understand movements of organisms over landscape features.*
Understand movements of organisms relative to sanctuary seascapes and movement between the sanctuary and surrounding waters. Complete ongoing research, including cooperative research, to tag and track Atlantic cod and expand the research to include other species.

Status: Ongoing.

Potential Partners: Proposed consortium, contractors, academia, MFP, fishermen.

(4.10) *Understand the effects of natural disturbance (e.g., storm and tidal events, predation) on seafloor habitats.*

Status: Ongoing.

Potential Partners: Proposed consortium, contractors, academia, MFP, fishermen.

(4.11) *Develop predictive larval recruitment, dispersal, and connectivity models.*
Models shall include sources, sinks, larval concentrations, and larval behaviors using data from various sources.

Status: Initiated by year 2.

Potential Partners: Academia, state and federal agencies.

(4.12) *Develop an internal oceanographic circulation model.*
This model will interface with other models and will tie together local, regional, and larger-scale patterns. Development of this model is essential to understand and predict egg and larval transport, and the fate and effect of nutrients and pollutants.

Status: Completed by year 3.

Potential Partners: Academia, GOM Ocean Observing System (GOMOOS).

(4.13) *Quantify pollutant loadings.*
The importance of natural and anthropogenic nutrient and other pollutant loadings to sanctuary waters, including flora and fauna, from local, sub-regional (Mass Bay), regional (GOM), and global sources shall be quantified.

Status: Completed by year 5.
Potential Partners: Academia, Massachusetts Water Resources Authority (MWRA), USGS.

(4.14) *Establish an integrated ocean observing system.*
This system shall collect real-time data at multiple depths on oceanographic and biological parameters identified to aid in ecosystem based management. The system could be a subset of the GOMOOS and would be implemented with a combination of surface buoys and seafloor sensors.

Status: Completed by year 5.

Potential Partners: GOMOOS, academia, fishermen, shippers.

STRATEGY EBM.5 – PROTECT ECOLOGICAL INTEGRITY

Strategy Summary

The primary goal of EBM is to protect the ecological integrity of the sanctuary. No one action is sufficient to protect the integrity of the system short of making the sanctuary a wilderness area. The purpose of this strategy is to implement a set of complementary actions that will ensure the integrity of the ecosystem.

Strategy Performance Measures:

1. Provide recommendations to the SAC on a zoning scheme by year 2.
2. Request that the NEFMC and NOAA Fisheries take action to prohibit the taking of sand eels in the SBNMS by year 1.
3. The level of bycatch in the SBNMS will be assessed by year 3.
4. The trophic importance of forage species will be assessed by year 4.

Activities (4)

(5.1) *Establish a zoning WG to evaluate the adequacy of existing zoning schemes in SBNMS to satisfy the scientific requirements and meet the goals of EBSM and if needed, develop a modified zoning scheme (including a consideration of fully protected reserves) to meet those goals and requirements.*
The zoning WG shall be established by the SAC at its November 2004 meeting for the purpose of reviewing and evaluating data and information as it becomes available through various venues (e.g., Omnibus Essential Fish Habitat process, sanctuary efforts) and making a recommendation to the SAC and ultimately to the sanctuary superintendent. The membership of the zoning WG shall be of representative stakeholder groups similar to the EBM WG. The zoning WG shall begin meeting in January 2005 in order to efficiently utilize the time that the final management plan is in preparation.

The zoning WG shall develop metrics for zone performance based on the objectives of the various zones as determined by the WG. These metrics shall form the foundation of a monitoring program designed to determine the efficacy of the zoning scheme and recommend any needed changes to accomplish the goals of the zoning scheme and EBSM.

The zoning WG shall make recommendations to the SBNMS regarding the zoning scheme within two years of the implementation of the final management plan as defined by the publication date for the Federal Register Notice notifying the public of the availability of the final management plan.

Status: Completed by year 2.

Potential Partners: Representative stakeholders.

(5.2) *Recommend implementation of a permanent ban on the exploitation of sand eels (Ammodytes spp.) within the SBNMS.*
Sand eels are an important forage species for baleen whales, groundfish, and pelagic fish and are an important component of the food web of the SBNMS and are currently unexploited. This activity will be implemented by the NEFMC and NOAA Fisheries at the request of the SBNMS.

Status: Initiate request by year 1.

Potential Partners: NEFMC, NOAA Fisheries, Atlantic States Fisheries Management Council (ASFMC).

(5.3) *Assess and minimize bycatch and discard.*
Bycatch of target and non-target species shall be minimized in the SBNMS. This activity will be implemented by the NEFMC.

Status: Completed by year 3.

Potential Partners: NEFMC, NOAA Fisheries, ASFMC.

(5.4) *Evaluate the need and ability to protect an adequate forage base for species within the sanctuary.*
Forage species such as Atlantic and river herring, squid, sand lance, and mackerel are an essential trophic resource for larger fishes, marine mammals and birds.

Status: Completed by year 4.

Potential Partners: NEFMC, NOAA Fisheries, MFP FISHER.

STRATEGY EBM.6 – EVALUATE THE NEED AND FEASIBILITY FOR MODIFYING THE SANCTUARY BOUNDARY.

Strategy Summary

This strategy is intended to evaluate the need for and feasibility of modifying the SBNMS boundary to include more of Jeffrey's Ledge. Jeffrey's Ledge may be an important habitat and resource area for characteristic species of the sanctuary. If results indicate that a change in the boundary is warranted, action should be taken by the SAC and the SBNMS to modify the sanctuary boundaries to include more of Jeffrey's Ledge.

Strategy Performance Measures:

1. Characterize the ecology and socioeconomics of Jeffrey's Ledge by year 5.
2. Understand the ecological relationship of Jeffrey's Ledge with the SBNMS by year 5.

Status: Completed by year 5.

Potential Partners: NEFMC, NOAA Fisheries, USCG, Whale Center of New England (WCNE), Center for Coastal Studies (CCS), stakeholders.

CONSIDERATIONS

The EBM WG acknowledges that the following activities are important components of EBM and should be considered in an EBM plan.

- Assess the extent of invasive species.
- Eliminate ballast water exchange.
- Enforce existing watershed protection measures.
- Assess speed restrictions.
- Mitigate impacts from pipelines, cables, and conduits.

However, the EBM WG recognizes that other WGs with more appropriate expertise have dealt with these issues in detail. Therefore, the EBM WG merely forwards them to the SAC for incorporation into a comprehensive EBM plan.